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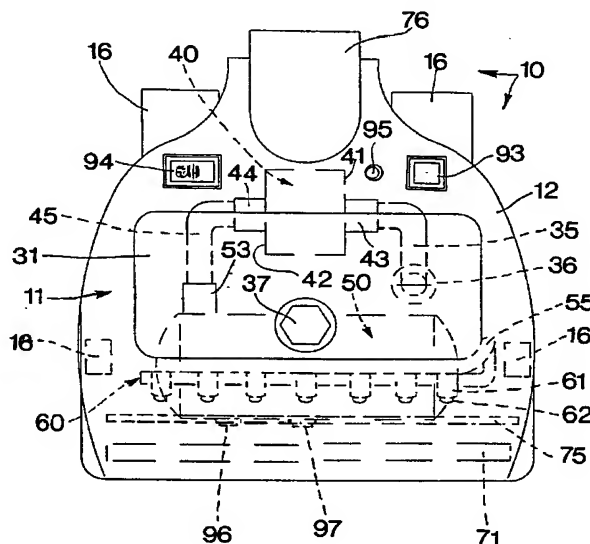
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(54) Title: ACCESSORY DEVICE FOR A PORTABLE LIQUID-SUCTION, WASH-AND-DRY, STEAM GENERATING APPLIANCE AND THE LIKE



(57) Abstract: Accessory device (10) for portable liquid-suction wash-and-dry appliances and the like comprising, within a box-shaped casing (11), a tank (30), a boiler (51) with electric heating element, a motor driven pump (40) a suction unit (70) with an oblong mouth (71) at the front and a rear chamber (74) in which the head (77) of a pipe union (76) can freely turn, said pipe union fitting into the tube for carrying fluid to said portable appliance, an electric shunting switch which, according to its position, permits operation of the motor-driven pump (40) only or, simultaneously with it, ignition of the heating element respectively for distribution of liquid or of steam (63) through a set of nozzles (62) aligned transversally below the base (13) of the device (10).

WO 01/21054 A1

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Accessory device for a portable liquid-suction, wash-and-dry, steam generating appliance and the like

15 Presently known portable appliances for cleaning indoor floors and surfaces such such appliances that wash and dry by suction and similar types, operate by association of a solvent, especially water, with a mechanical brushing action to facilitate removal of dirt.

Appliances have recently appeared on the market for cleaning
20 vertical structures and articles of furniture as well as floors, that combine the use of heat, pressure and humidification produced simultaneously by steam emitted at suitable pressure and temperature, such appliances representing an undoubted improvement on former types due to the speed and ease with which they can clean
25 areas where dirt is hardened on and difficult to remove.

Purpose of the above invention is to associate heat and pressure, to the action by mechanical means and solvents offered by presently known appliances that and wash and dry by suction, this being done by an accessory steam emitting device easily fitted onto
30 said appliances, providing considerable advantages of speedy and effective action as will now be explained.

Subject of the invention is an accessory steam-producing device for

the above portable appliances comprising, inside its box-shaped casing:

- a tank to hold liquid, especially water
- a steamer with boiler and electric heating element
- 5 - a motor-driven pump to pump liquid from the tank to the boiler and steamer
- a chamber for distribution of liquid or steam
- a brush for mechanically loosening dirt
- a suction unit to connect with the tube on portable appliances
- 10 - two pairs of wheels to assist movement across the surface to be cleaned
- an electric circuit to supply and operate controls and safety.

The casing preferably presents an upper front wall, a base, two sides and a downwardly-inclined wall at the rear.

- 15 The tank for liquid is placed uppermost inside the casing and is closed by a plug on said casing's upper surface.

The motor-driven pump and steam boiler are substantially cylindrical and are preferably situated between the base of the casing and the tank for liquid at its lower longitudinal cylindrically concave edges, the pump occupying an approximately central position and
20 the boiler lying towards the front end of the casing.

The oblong chamber from which liquid is distributed is advantageously situated under the base of the casing between the front pair of wheels and the brush, and aligned along its length are a
25 number of nozzles.

Three tubes respectively connect: the first one, a mouth in the bottom of the tank to a mouth in one side of the pump, the second tube connects a mouth in the other side of said pump to a lateral mouth in the steam boiler and the third tube connects a mouth in
30 the side of said boiler to the oblong chamber for distribution of liquid.

The suction unit comprises an oblong aperture under the base of the casing at its front end, a longitudinal channel between the motor-driven pump-steamer unit and the flat base of the casing, a substantially cone-shaped conveyor that expands enabling it to connect up with a transversal cylindrical chamber within which the cylindrical head of a pipe union can freely turn round a pin, said head having in it a mouth facing towards the conveyor.

Said pipe union fits into the end of the tube for passage of fluid to the usual portable appliances and the like that wash and dry by suction.

The tank, motor-driven pump, steamer boiler, oblong chamber for distribution of liquid, the pipe union's geometrical axis of rotation, the geometrical axes of the pairs of front and rear wheels and the brush, are all preferably transversal to the longitudinal axis of the device and are therefore substantially parallel one to another.

The electric circuit comprises a main switch and a shunting switch ; when the device is switched on this latter, according to its position, causes the motor-driven pump to operate alone or simultaneously with ignition of the steam boiler's heating element, so that liquid is distributed in the first case and steam in the second.

Two thermostats are mounted on the electric circuit, at the position of the boiler's heating elements, an overload thermostat for maximum heat which is normally turned on, and an underload thermostat for minimum heat which is normally turned off.

When the previously set steam pressure level has been reached, the overload thermostat automatically switches off and comes on again when pressure falls below the fixed limit.

When steam pressure falls below said fixed limit the underload thermostat automatically switches on to raise pressure to the desired level.

The main and shunting switches are situated on the upper surface

of the casing while the thermostats are placed on the body of the boiler for producing steam.

The invention offers evident advantages.

Mechanical action of a brush and chemical action of a liquid, especially water, as in the presently known liquid suction, wash-and-dry appliances, is associated to action of steam whose pressure and temperature greatly increase the efficiency and speed of cleaning operations, this being done without any change to present appliances but merely by completing them with an accessory that is both inexpensive in cost and compact in size.

This accessory is simple to operate and is perfectly coordinated with equipment to which it can be associated forming what may be considered as a natural completion of liquid-suction, wash-and-dry appliances and the like.

Characteristics and purposes of the disclosure will be made still clearer by the following example of its execution illustrated by diagrammatically drawn figures.

Fig 1 The accessory device associated to a liquid suction appliance, view in perspective.

Fig. 2 Longitudinal section of the accessory device.

Fig. 3 Plan view of the accessory device.

Fig. 4 Front view of the accessory device.

Fig. 5 Perspective detail of the accessory device showing essential internal parts.

Fig. 6 Layout of the electric circuit when liquid is distributed.

Fig. 7 The same circuit when steam is distributed.

The device 10 consists of a casing 11 that essentially comprises a continuous frontal-upper wall 12, a flat base 13, an inclined rear wall 15 and two sides 14.

Inside the casing, approximately in a central position along the frontal-upper wall 12, is an oblong tank 30 with a fixed lid and a

screw cap 32 in the upper surface.

Between the tank 30 and the base 13 of the casing 11, at the position of said tanks' lower edge in which there are cylindrical concavities 33, the motor-driven pump 40 is situated towards the rear and the cylindrical steamer 50, with its boiler 51 and electric heating element 56, at the front.

A tube 35 connects the mouth 36 in the base 32 of the tank 30 with one side 41 of said motor-driven pump 40.

A second tube 45 connects the mouth 44 in the other side 42 of said pump 40 with a mouth 53 in the cylindrical wall of the boiler 51 for the steamer 50.

A third tube 55 connects the mouth 54, in the side 52 of the boiler 51 for the steamer 50, with an oblong chamber 60 for distribution of the liquid placed below the base 13 of the casing 11, there being fitted to said chamber a series of nozzles 62.

A suction tube 70 departs from the base 13 of the casing 11, forms a wide curve to become a cone-shaped conveyor 73, the mouth 71 of said tube in the base 13 connecting with a cylindrical suction chamber 74 that receives the head 77, with mouth 78, of a pipe union 76 rotating round two lateral pins 79 and suitable for fitting onto the usual connecting tubes 112 joined by a flexible tube 111 to the liquid-suction wash-and-dry cleaning appliances in present use.

Two pairs of wheels, a front pair 16 and rear pair 17 with pins 18 are fixed to the base 13 of the casing 11, wheels that freely turn on their front 19 and rear 20 supports.

An electric heating element 56 is mounted in the boiler 51 for the steamer 50.

The main switch 93, the shunt switch 94 and pilot light 95 to show ignition are situated on the upper surface of the casing.

Two thermostats 96 and 97, an overload thermostat (normally on) and one for underload (normally off) are mounted on the body of

the boiler 51.

The essential electrical connections are shown in diagrams 90, 90' in Figures 6 and 7. In addition to the components already described, these comprise wiring 89 for electric feed, a capacitor
5 100, connector 99 and heat fuse 98.

The device operates very simply.

After filling the boiler 51 for the steamer 50 with liquid, especially water, having turned the main switch 93 on, and the shunt switch 94 to the position shown in Figure 6, the motor-driven pump 40 enters
10 into operation by means of connections 101 for distribution of water or solvent needed for cleaning purposes.

If the shunt switch 94 is in the position 94' shown in Figure 7, when the main switch 93 is turned on and by means of connections 102, the heating element 56 on the boiler 51 for the steamer 50 is also
15 turned on.

Water therefore enters the boiler 51 where it is transformed into steam 63 and emerges through the nozzles 62.

Little by little as the back-and-forth movement of the brush 75 cleans the dirty surface, the loosened dirt can be sucked up through
20 the mouth 71, channel 72, conveyor 73 and mouth 78 in the head 77 of the pipe union 76,76' and on into the cleaning appliance 110 of the ordinary type.

When the appliance is cold the overload thermostat 96 is turned on and therefore adequate electric power is absorbed to produce the
25 maximum amount of steam.

On reaching the previously set level of pressure, the overload thermostst 96 automatically switches off thus stopping power feed until it is automatically resumed when production of steam causes pressure in the boiler to fall below a certain limit.

30 Whenever steam pressure falls below the previously set values the underload thermostat is automatically switched on.

CLAIMS

1. Accessory device (10) for generating steam for portable liquid suction wash-and-dry appliances and the like, characterized in that it comprises the following parts inside a box-shaped casing (11):
 - a tank (30) to hold liquid, especially water
 - a steamer (50) with boiler (51) and electric heating element (56)
 - a motor-driven pump to transfer liquid from the tank (30) to the boiler (51) for the steamer (50)
 - a chamber (60) for distribution of liquid or steam
 - a brush (75) for mechanically loosening dirt
 - a suction unit (70) to connect with the tube (112) for operating portable appliances (110)
 - two pairs of wheels (16, 17) to assist movement across the surface to be cleaned
 - an electric circuit (90, 90') to feed operational and safety controls
2. Accessory device as in claim 1, characterized in that the casing (11) has an upper front wall (12), a base (13), two sides (14) and a downwardly-inclined rear wall (15).
3. Accessory device as in claim 1, characterized in that the tank (30) for liquid, with external plug (37), is placed in the upper part of the casing (11).
4. Accessory device as in claim 1, characterized in that the motor-driven pump (40) and the boiler (51) for the steamer (50) are substantially cylindrical and are situated between the base (13) of the casing (11) and the tank (30) where its lower longitudinal edges assume a cylindrical concave shape, the motor-driven pump (40) occupying a central position, the boiler (51) being placed at the front end of the casing (11).
5. Accessory device as in claim 1, characterized in that the oblong chamber (60) for distribution of

liquid is placed below the base of the casing (11) between the front pair of wheels (16) and the brush (75) and comprises a set of nozzles (62) aligned along the length of the chamber (60).

6. Accessory device as in claim 1,

5 characterized in that the following parts are respectively connected by three tubes (35, 45, 55), the first connecting a mouth (36) in the bottom of the tank (30) with a mouth (43) on one side (41) of the pump (40), the second connecting a mouth (44) in the other side (42) of the pump (40) with a lateral mouth (53) in the boiler (51) for
10 the steamer (50), and the third connecting a mouth (54) in the side of said boiler with the oblong chamber (60) for distribution of liquid.

7. Accessory device as in claim 1,

characterized in that the suction unit (70) comprises an oblong mouth (71) placed transversally under the base (13) of the casing
15 (11) at its front end, a longitudinal channel (72) between the pump unit (40), the steamer (50) and the flat base (13) of the casing (11), a substantially cone-shaped conveyer (73) that expands from the channel (72) to join a transversal cylindrical chamber (74) within which the cylindrical head (77) with mouth (78) of a pipe union (76)
20 can freely turn round pins (79), said pipe union being made to fit into the liquid-carrying tube (112) of liquid-suction wash-and-dry cleaning appliances (110) and the like.

8. Accessory device as in claim 1,

characterized in that the tank (30), the motor-driven pump (40), the
25 boiler (51) for the steamer (50), the oblong chamber (60) for distribution of liquid, the geometrical axis of rotation of the pipe union (76), the geometrical axes of the front and rear pairs of wheels and the brush (75) are all placed transversally to the longitudinal axis of the device and are therefore substantially parallel one to another.

30 9. Accessory device as in claim 1,

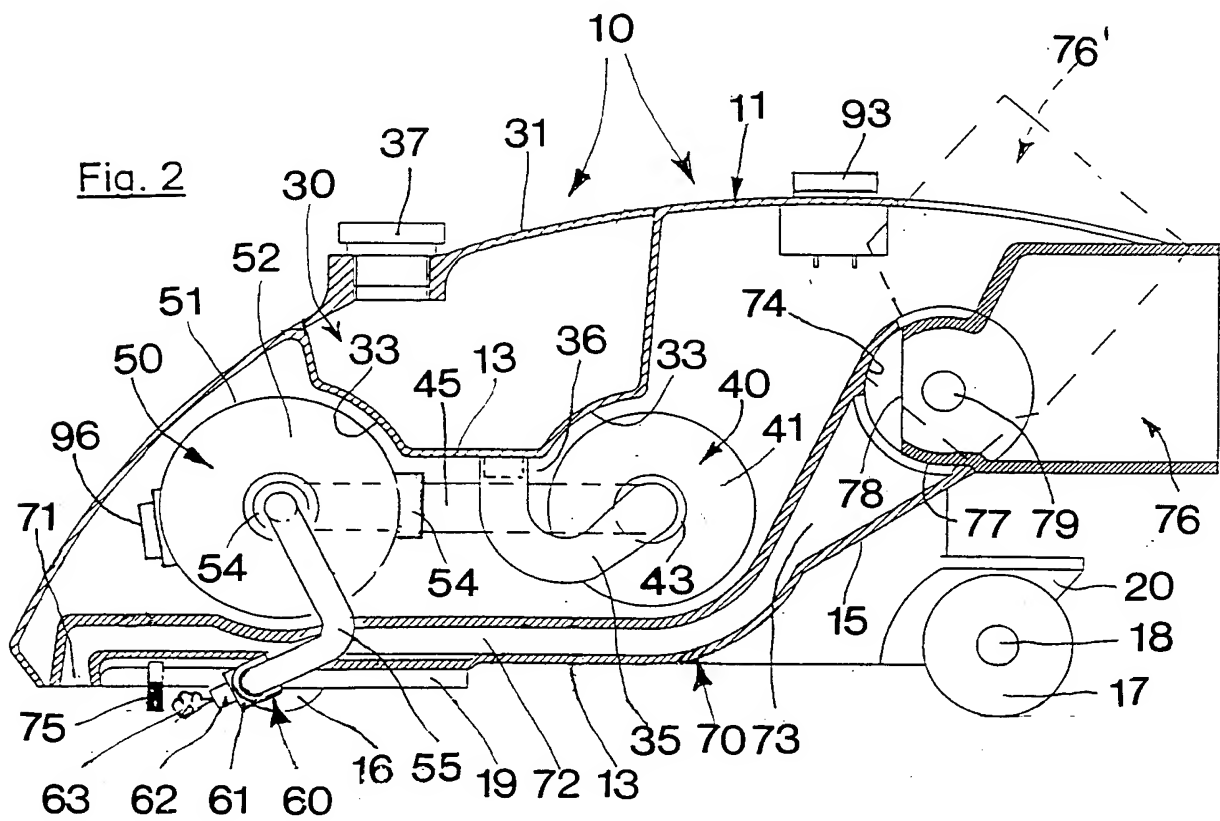
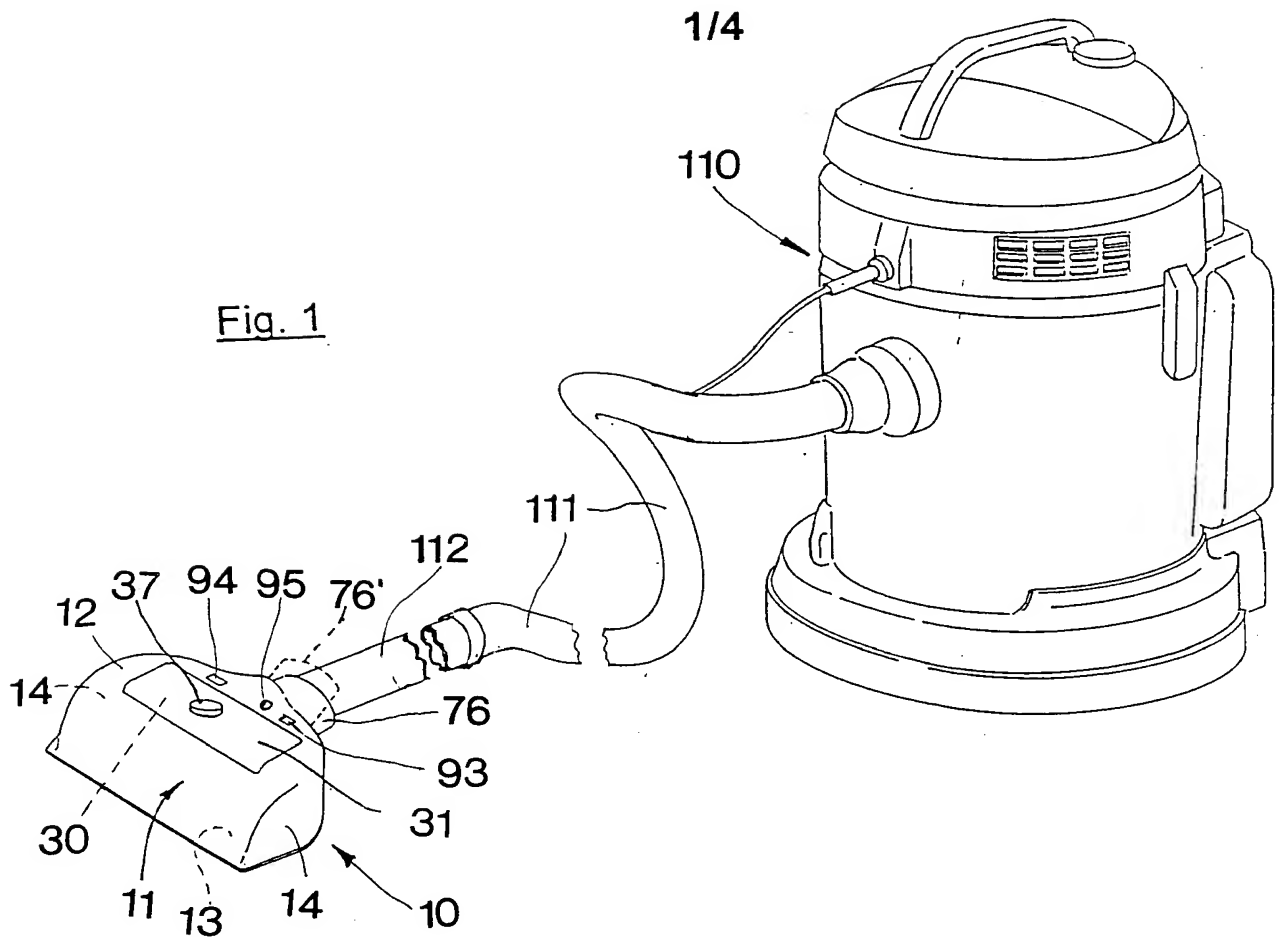
characterized in that the electric circuit (90) comprises a main

switch (93) and a shunting switch (94) which, according to its position and with the main switch (93) turned on, respectively determines action of the motor-driven pump (40) only, or simultaneously, ignition of the heating element (56) on the boiler (51) for the
5 steamer (50) to obtain distribution of liquid in the first case and distribution of steam (63) in the second.

10. Accessory device as in claim 1,
characterized in that, at the position of the electric heating element (56) on the boiler (51) for the steamer (50), the electric circuit (90,
10 90') comprises an overload thermostat (96) normally switched on and an underload thermostat (97) normally switched off, the overload thermostat (97) automatically switching off when the set pressure level of steam is reached and switching on again when pressure falls below the established limit, the underload thermostat
15 automatically switching on when steam pressure falls below the set limit determining in this way maintenance of an optimum level of pressure.

11. Accessory device as in claims 1 and 9
characterized in that the main switch (93) and shunt switch (94) are
20 situated on the upper surface (12) of the casing (11) of the device.

12. Accessory device as in claims 1 and 10,
characterized in that the thermostats (96) and (97) are placed on the body of the boiler (51) for the steamer (50).



2/4

Fig. 3

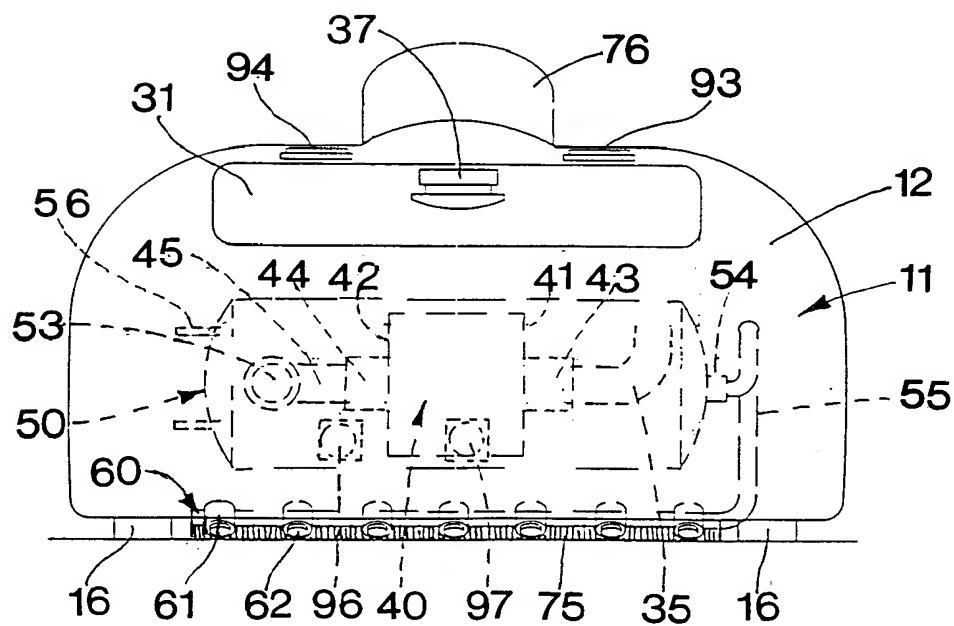
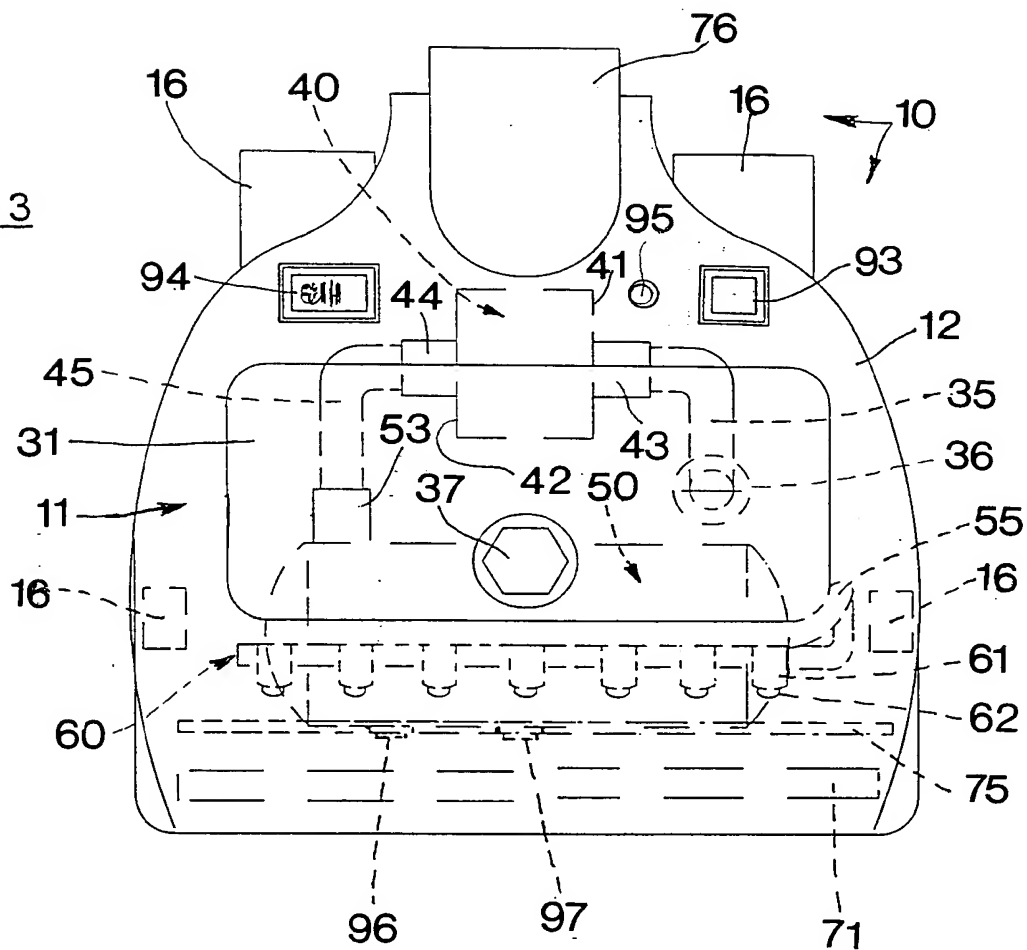
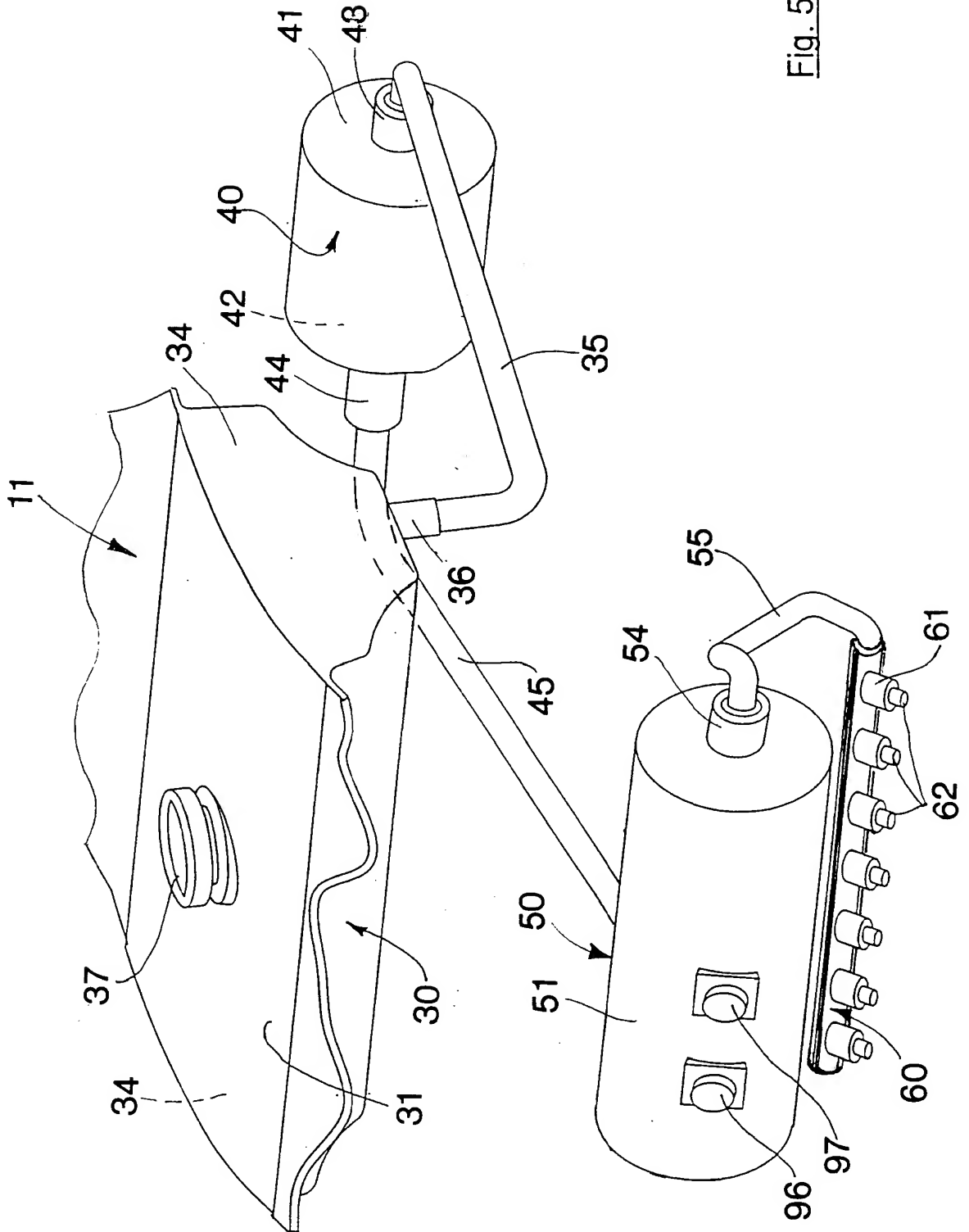
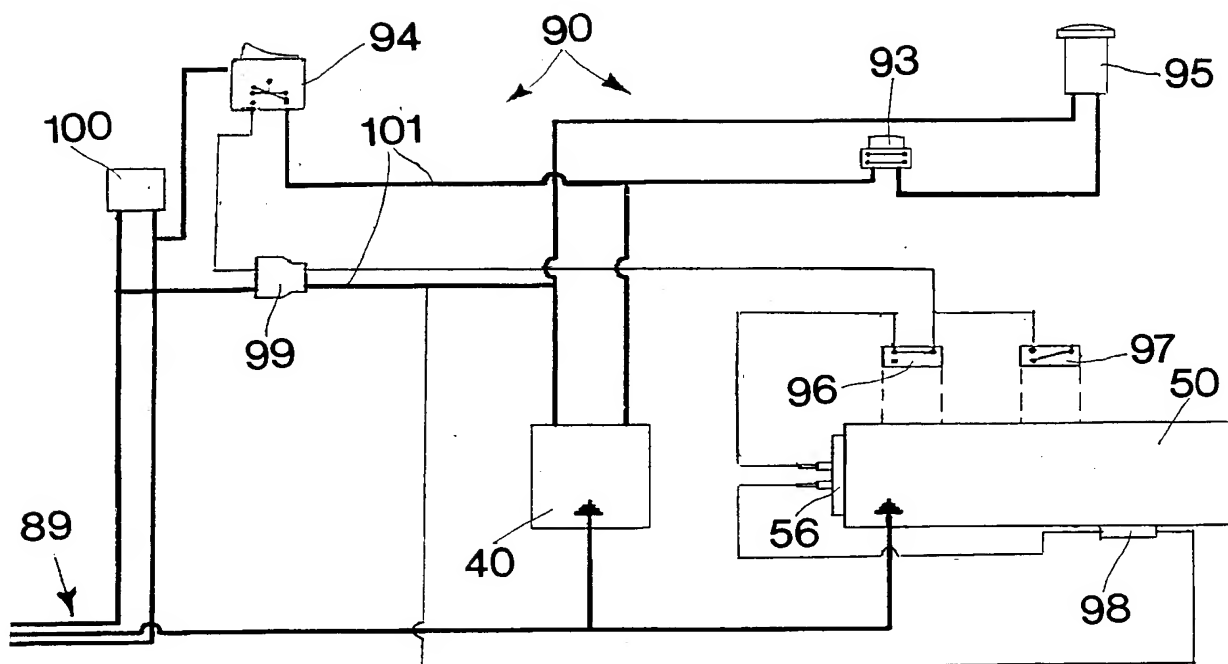
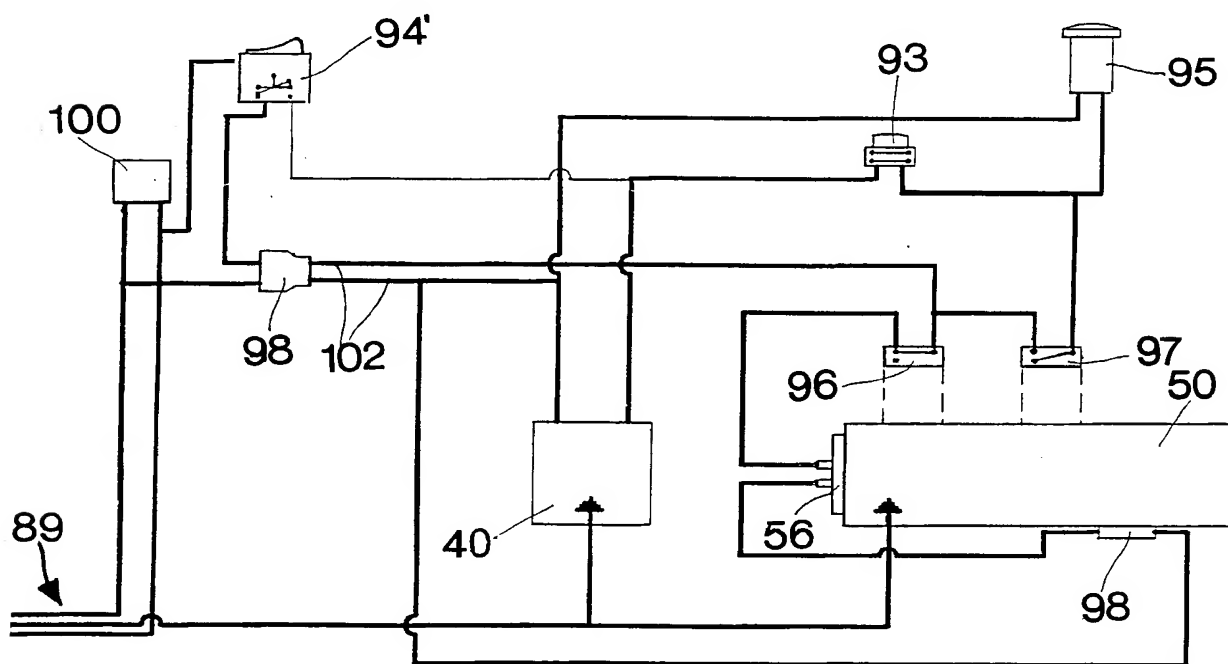


Fig. 4

3/4



Fig. 6Fig. 7

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IT 99/00350

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A47L11/34 A47L9/06 A47L9/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 06, 30 April 1998 (1998-04-30) -& JP 10 043099 A (TEC CORP), 17 February 1998 (1998-02-17) abstract; figures	1
A	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 06, 31 March 1999 (1999-03-31) -& JP 01 027526 A (MATSUSHITA ELECTRIC IND CO LTD), 30 January 1989 (1989-01-30) abstract; figures	1

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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

International Application No.

PCT/IT 99/00350

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 083 077 A (KNIGHT A M ET AL) 11 April 1978 (1978-04-11) abstract column 3, line 25 - line 50 column 4, line 1 - line 32 figures 1,2,4,5 -----	1
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INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

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